

REMARKS

Claims 1-22 are presently pending in the application. Reconsideration and allowance of all claims are respectfully requested in view of the following remarks.

The Examiner has objected to the drawings for not including reference numeral 62 in Fig. 5, and reference numeral 66 in Fig. 6. Further, the Examiner states that Figs. 1 and 2 should be designated by the legend --Prior Art--.

The Examiner is respectfully requested to acknowledge receipt of three (3) sheets of Replacement Drawings which correct Figs. 1 and 2 to add the legend --Prior Art--, and add the appropriate reference numerals to Figs. 5 and 6, as well as other minor corrections to the figures. Accordingly, the Examiner's objection to the drawings should be withdrawn.

Paragraphs [0001] and [0050] of the specification have been objected to by the Examiner because of informalities. Paragraphs [0001] and [0050] have been amended to ensure that any informalities noted by the Examiner have been corrected.

Further, the specification is also objected to by the Examiner as failing to provide proper antecedent basis for the claimed subject matter. The Examiner alleges that Claims 11 and 22, the drawings and the specification of the disclosure fail to show or recite the diffractive optical element being positioned in the back focal plane of the focusing element.

The Applicants respectfully submit that the disclosure at page 10, lines 6-8, state that the diffractive optical element 40 in Fig. 3 is disposed substantially in a plane 42 conjugate to the back aperture 24 of the objective lens 20 (i.e., the focusing element). Further, the focusing optical element can be an objective lens 20 as in Figs. 3-4, and as stated on page 11, lines 15-28, of the disclosure. Accordingly, the specification and Figs. 3-4 provide proper antecedent basis for the claimed subject matter of Claims 11 and 22, and the Examiner's objection should be withdrawn.

Double Patenting Rejections

The Examiner has rejected Claims 1-8, 10-19 and 21-22 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-49 of U.S. Patent No. 6,055,106, of record.

Claims 9 and 20 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-49 of U.S. Patent No. 6,055,106 in view of Ashkin et al. (U.S. Patent No. 4,893,886), of record.

Claims 1-2, 7, 12-13 and 18 were rejected under the judicially created doctrine of obviousness-type double patent as being unpatentable over Claims 1-18 of U.S. Patent No. 6,416,190.

The Examiner has rejected Claims 1-2, 7, 12-13 and 18 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-25 of U.S. Patent No. 6,626,546.

Claims 1-4, 7, 12-15 and 18 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-24 of the U.S. Patent No. 6,737,634.

Claims 1-2, 7, 12-13, and 18 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-10 of co-pending Application No. 10/210,519 (U.S. Patent Application Publication US2004/0021949).

The Examiner states that although the conflicting claims are not identical, they are not patentably distinct from each other because the differences of the claimed invention from the claims of the above references, would have been an obvious variation of the claims of the above references. However, the Examiner has indicated that a timely filed terminal disclaimer under 37 CFR §1.321(c) may be used to overcome the double-patenting rejections.

In the interests of furthering the prosecution of this case, the Applicants hereby submit

concurrently herewith, terminal disclaimers directed to each of the references applied as double patenting references. The terminal disclaimers should obviate the Examiner's rejection of the above claims.

Prior Art Rejections

Claims 1-2, 4, 6-9, 12-13, 15 and 17-20 are rejected under 35 U.S.C. §102(e) as being anticipated by Neal (U.S. Patent No. 5,939,716).

The Applicants respectfully submit that Neal does not teach or suggest a method for manipulating a plurality of particles by forming and moving a plurality of optical traps, the method comprising: providing at least one laser beam from at least one source; applying the at least one laser beam to diffraction means for simultaneously creating a plurality of separate laser beams from each of the at least one laser beam; establishing an optical gradient for each of the plurality of separate laser beams to form a plurality of separate optical traps for moving (and trapping) the plurality of particles; and performing a manufacturing process which changes the position of at least one of the plurality of particles, as recited in Claims 1 and 12.

Rather, Neal is directed to a method and apparatus for containing a single reflective particle in a single light cage. Specifically, Neal discloses that "(t)he present invention is a method and apparatus for trapping a reflective ... particle without the use of a scanning mirror, multiple light sources, or active feedback control mechanism" (emphasis added). Neal teaches the use of a light beam from "single source 26" (col. 5, line 51), to illuminate an optics system 32 and generate a number of discrete focussed beams using a diffractive element 18, where the set of focussed beams create a "light cage" 10 (see col. 5, lines 50-59). Further, Neal discloses that "at least three focussed beams are required to provide passive stability within the light cage 10, with greater stability being achieved as the number of focussed beams is increased" (see col. 5, lines 63-67). However, only a single particle is trapped within the single light cage 10 formed by the three focussed beams in Neal.

In contrast to Neal, the present invention is directed to using at least one light source to generate at least one laser beam (see page 10, lines 1-3, of the present specification), passing that beam through a diffraction means to form a plurality of separate laser beams, and establishing an optical gradient for each of the separate laser beams to form a plurality of separate optical traps for moving and trapping a plurality of particles (see page 9, lines 2-10 of the present specification). These optical traps can be moved separately to move the plurality of particles in the separate traps in different directions if desired (i.e., see page 12, lines 3-11, of the present specification).

In fact, Neal teaches away from multiple beams forming multiple light cages. Further, assuming *arguendo* that Neal could be adapted to form multiple light cages, Neal teaches that it would require at least three beams per light cage to trap each particle, rather than a single beam for trapping each particle as in the present invention.

Accordingly, the present invention is not anticipated by, nor obvious over Neal, and the rejection of Claims 1 and 12 under 35 U.S.C. §102(e) should be withdrawn.

The Examiner has rejected Claims 3 and 14 under 35 U.S.C. §103(a) as being unpatentable over Neal in view of Long (U.S. Patent No. 5,986,781).

The addition of the Long reference does not make up for the deficiencies in Neal.

Accordingly, Claims 3 and 14 are patentable over either the individual or the combination of the Neal and Long references, and the rejection of Claims 3 and 14 under 35 U.S.C. §103 should be withdrawn.

Claims 5 and 16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Neal in view of Sasaki et al. (K. Sasaki, M. Koshioka, H. Misawa, N. Kitamura, H. Masuhara, "Pattern formation and flow control of fine particles by laser-scanning micromanipulation", Opt. Lett., vol. 16, no. 19, October 1, 1991, pp. 1463-1465.).

The addition of the Sasaki et al. reference does not make up for the deficiencies in Neal.

Accordingly, Claims 5 and 16 are not obvious over either the individual or the combination of the Neal and Sasaki et al. references, and the rejection of Claims 5 and 16 under 35 U.S.C. §103 should be withdrawn.

Claims 10 and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Neal in view of Sasaki et al.

The Applicants' respectfully submit that one of ordinary skill in the art would not have combined the Neal and Sasaki et al. references, since Neal clearly teaches away from the use of scanning mirrors (see col. 5, lines 43-46), on which the Examiner relies in Sasaki et al. for use in combination with Neal.

Accordingly, Claims 10 and 21 are not obvious over either the individual or the combination of the Neal and Sasaki et al. references, and the rejection of Claims 10 and 21 under 35 U.S.C. §103 should be withdrawn.

Finally, the Examiner has rejected Claims 11 and 22 under 35 U.S.C. §103(a) as being unpatentable over Neal.

Since Claims 2-11 depend from Claim 1, and Claims 13-22 depend from Claim 12, they are also patentably distinguishable over Neal for the reasons cited above with respect to Claims 1 and 12.

If the Examiner believes that there is any issue which could be resolved by a telephone or personal interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee for such an extension is to be charged to Deposit Account No. 04-1061.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

David G. GRIER et al.

Group Art Unit: 2872

Application No.: 10/605,319

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For: APPARATUS FOR APPLYING OPTICAL GRADIENT FORCES

SUBMISSION OF CORRECTED FORMAL DRAWINGS

Commissioner for Patents
P.O. Box 1450
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Sir:

Please find attached three (3) sheets of corrected formal drawings (Figures 1-6). The Examiner is respectfully requested to acknowledge receipt of these drawings.

Respectfully submitted,

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